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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/640,479	08/16/2000	Kyung-Su Park	40056/DBP/Y35	4548

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EXAMINER

ZIMMERMAN, GLENN

ART UNIT	PAPER NUMBER
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2879

DATE MAILED: 06/28/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/640,479

Applicant(s)

PARK, KYUNG-SU

Examiner

Glenn Zimmerman

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-17 is/are pending in the application.
- 4a) Of the above claim(s) 10 and 11 is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-9 and 12-17 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☒ Claim(s) 1-17 are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 16 August 2000 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on ____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) ____.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). ____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Election/Restrictions

Restriction to one of the following inventions is required under 35 U.S.C. 121:

- I. Claims 1-9 and 12-17, drawn to a vacuum fluorescent lamp, classified in class 313, subclass 497.
- II. Claims 10 and 11, drawn to a method of manufacturing a vacuum fluorescent lamp, classified in class 315, subclass 167.

The inventions are distinct, each from the other because of the following reasons:

Inventions group II and group I are related as process of making and product made. The inventions are distinct if either or both of the following can be shown: (1) that the process as claimed can be used to make other and materially different product or (2) that the product as claimed can be made by another and materially different process (MPEP § 806.05(f)). In the instant case the electron emissive means could be placed in the envelope before the display means.

Because these inventions are distinct for the reasons given above and have acquired a separate status in the art as shown by their different classification, restriction for examination purposes as indicated is proper.

During a telephone conversation with Bruce Prout on 6/17/02 a provisional election was made with traverse to prosecute the invention of a vacuum fluorescent lamp, claims 1-9 and 12-17. Affirmation of this election must be made by applicant in replying to this Office action. Claims 10 and 11 are withdrawn from further

consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.

Drawings

Figure 5 should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g). A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mera et al. U.S. Patent 4,122,376 in view of Tatsuda et al. U.S. Patent 4,972,116, Hase et al. U.S. Patent 4,208,613 and Curtin et al. U.S. Patent 5,686,790.

Referring to claim 1, Mera et al. teach a vacuum fluorescent display (**col. 1 lines 5-6; col. 4 line 16**) comprising: a pair of substrates (**glass base plate and glass cover plate Fig. 3 ref. 11 and 12 respectively**) and sides (**casing s am ref. 14**) surrounding an evacuated envelope (**vacuum casing ref. 13**); a display means (**bas plate , wiring**

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layer, insulating layer, an d segm nt, conn cting holes and phosphor layer Fig. 3 refs. 11, 15, 16, 18, 20a and 19 respectively), provided on one of the substrates (base plate ref. 11) in the evacuated envelope, capable of having a positive potential applied thereto (col. 8 lines 64-66), for displaying a predetermined image (col. 1 lines 13-16) in response to electrons emitted from the electron emissive means; and an electron control means (diffusion electrode ref. 28; col. 6 lines 50-54) for generating a repulsive electric field to allow acceleration of electrons emitted from the electron emissive means in the direction of the display means, wherein the electron emissive means is located between the display means and electron control means (Fig. 3 ref. 28), but fail to teach that the sides are made of glass. Tatsuda et al. in the analogous art teach sides made of glass (col. 1 lines 34-37).

Consequently it would have been obvious to a person having ordinary skill in the art at the time the invention was made to use sides of glass in the vacuum fluorescent display of Mera et al., since such a modification would be conventional.

Regarding claim 1, Mera et al. teach all the limitations of claim 1, but fail to teach an electron emissive means for emitting electrons when a negative potential is applied which is that each cathode filament comprises a tungsten core coated with oxides of barium, strontium and potassium. Curtin et al. in the analogous art teach a tungsten cathode wire coated with strontium oxide and barium oxide (col. 15 lines 39-52). The cathode of Curtin et al. is an art recognized equivalent for the cathode filament of the instant application of the electron emissive means. This prior art cathode performs the identical function of emitting electrons as specified in the claim in substantially the same

way, and produces substantially the same results as the corresponding element disclosed in the specification. Additionally, Curtin et al. teach incorporation of such cathode to improve the structure by providing a clean cathode that is useful and efficient (**col. 15 lines 45-52**). This incorporation would also be conventional.

Consequently it would have been obvious to a person having ordinary skill in the art at the time the invention was made to use tungsten cathode wires coated with strontium oxide and barium oxide for the cathode of Mera et al., since such a modification would improve the structure by providing a clean cathode that is useful and efficient as taught by Curtin et al. and also be conventional. The cathode of Curtin et al. is also an art recognized equivalent for a cathode filament comprising a tungsten core coated with oxides of barium, strontium and potassium.

Regarding claim 1, Mera et al. teach all the limitations of claim 1, but fail to teach the display means phosphor is ZnO:Zn. Hase et al. in the analogous art teach a phosphor layer using ZnO:Zn (**col. 1 lines 67 and 68; col. 2 lines 1-4**). Additionally, Hase et al. teach incorporation of such a phosphor to improve the structure by emitting light of high luminance under low-velocity electron excitation (**col. 2 lines 1-4**).

Consequently it would have been obvious to a person having ordinary skill in the art at the time the invention was made to use ZnO:Zn in the display means of Mera et al. since such a modification would improve the structure by emitting light of high luminance under low-velocity electron excitation as taught by Hase et al..

Referring to claim 2, Mera et al. teach all of the limitations of the claim. Mera et al. teach wherein the electron control means is mounted on the other substrate (**col. 6 lines 42-46**).

Claim 3 is rejected for the same reason as claim 1. Many potentials both positive and negative can be supplied to the electron control means.

Claim 4 is rejected for the same reason as claim 2. Many potentials both positive and negative can be supplied to the electron control means.

Claim 5 is rejected for the same reason as claim 3.

Referring to claim 6, Mera et al. teach all of the limitations of the claim. Mera et al. teach wherein the electron control means is a layer of a transparent electrically conductive material (**col. 7 lines 1-4**).

Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Mera et al. U.S. Patent 4,122,376 in view of Tatsuda et al. U.S. Patent 4,972,116, Hase et al. U.S. Patent 4,208,613, Curtin et al. U.S. Patent 5,686,790 and Tischer U.S. Patent 4,588,921.

Regarding claim 7, Mera et al. in view of Tatsuda et al., Hase et al. and Curtin et al. U.S. Patent 5,686,790 teach all the limitations of claim 16, but fail to teach wherein the transparent electrically conductive material is tin doped indium oxide. Tischer in the analogous art teach wherein the material is tin doped indium oxide (**col. 2 lines 23-38**). Additionally, Tischer teaches incorporation of such a tin doped indium oxide to improve the transparency (**col. 2 lines 26-27**).

Consequently it would have been obvious to a person having ordinary skill in the art at the time the invention was made to use tin doped indium oxide in the vacuum fluorescent display of Mera et al. in view of Tatsuda et al. and Hase et al. since such a modification would improve transparency as taught by Tischer.

Claims 8 and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mera et al. U.S. Patent 4,122,376 in view of Tatsuda et al. U.S. Patent 4,972,116, Hase et al. U.S. Patent 4,208,613, Curtin et al. U.S. Patent 5,686,790 and Fahlen et al. U.S. Patent 5,589,731.

Referring to claim 8, Mera et al. in view of Tatsuda et al., Hase et al. and Curtin et al. U.S. Patent 5,686,790 teach all the limitations of claim 17, but fail to teach further comprising a control electrode located near the electron emitter to control trajectories of emitted electrons. Fahlen et al. in the analogous art teach a control electrode **(directional electrodes Fig. 2A ref. 210)** located near the electron emitter **(thermionic cathode wires ref. 209)** to control trajectories of emitted electrons **(col. 5 lines 46-51)**. Additionally, Fahlen et al. teaches incorporation of such a control electrode to improve the electron distribution and electron paths by helping to shape **(col. 5 lines 46-51)**.

Consequently it would have been obvious to a person having ordinary skill in the art at the time the invention was made to use a control electrode located near the electron emitter in the vacuum fluorescent display of Mera et al. in view of Tatsuda et al. and Hase et al. since such a modification would improve the electron distribution and electron paths helping to shape as taught by Fahlen et al..

Claim 9 is rejected for the same reason as claim 8. One can apply many potentials to the control electrode means as desired.

Claims 12-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mera et al. U.S. Patent 4,122,376 in view of Tatsuda et al. U.S. Patent 4,972,116.

Referring to claim 12, Mera et al. teach a vacuum fluorescent display (**col. 1 lines 5-6; col. 4 line 16**) comprising: a pair of substrates (**glass base plate and glass cover plate Fig. 3 ref. 11 and 12 respectively**) and sides (**casing seam ref. 14**) surrounding an evacuated envelope (**vacuum casing ref. 13**); a display (**wiring layers, insulating layer, segment anodes, fluorescent material layer, connecting holes, connecting holes, electrification-preventing layer, shield layer and shield-electrode layers ref. 15,16,18,19, 20a, 20b, 24, 26 and 27 respectively**) provided on one of the substrates (**base plate ref. 11**) in the evacuated envelope; an electron controller (**mesh shaped diffusion electrode or transparent conductive layer such as tin oxide nesa diffusion electrode ref. 28**) to allow acceleration of electrons toward the display; and an electron emitter (**cathode ref. 22**) located between the display and electron controller, but fail to teach that the sides are made of glass. Tatsuda et al. in the analogous art teach sides made of glass (**col. 1 lines 34-37**).

Consequently it would have been obvious to a person having ordinary skill in the art at the time the invention was made to use sides of glass in the vacuum fluorescent display of Mera et al., since such a modification would be conventional.

Referring to claim 13, Mera et al. teach all of the limitations of the claim. Mera et al. teach wherein the electron controller (**diffusion I ctrod ref. 28**) is mounted on the

other substrate (glass cover plate and inside surface of the cover plate) of Fig. 12 and 29 respectively; col. 5 lines 4-10).

Claims 14 and 15 are rejected for the same reason as claim 12.

Claim 16 is rejected under 35 U.S.C. 103(a) as being unpatentable over Mera et al. U.S. Patent 4,122,376 in view of Tatsuda et al. U.S. Patent 4,972,1160 and Tischer U.S. Patent 4,588,921.

Regarding claim 16, Mera et al. in view of Tatsuda et al. teach all the limitations of claim 16, but fail to teach wherein the transparent electrically conductive material is tin doped indium oxide. Tischer in the analogous art teach wherein the material is tin doped indium oxide (col. 2 lines 23-38). Additionally, Tischer teaches incorporation of such a tin doped indium oxide to improve the transparency (col. 2 lines 26-27).

Consequently it would have been obvious to a person having ordinary skill in the art at the time the invention was made to use tin doped indium oxide in the vacuum fluorescent display of Mera et al. in view of Tatsuda et al. since such a modification would improve transparency as taught by Tischer.

Claim 17 is rejected under 35 U.S.C. 103(a) as being unpatentable over Mera et al. U.S. Patent 4,122,376 in view of Tatsuda et al. U.S. Patent 4,972,1160 and Fahlen et al. U.S. Patent 5,589,731.

Referring to claim 17, Mera et al. in view of Tatsuda et al. teach all the limitations of claim 17, but fail to teach further comprising a control electrode located near the electron emitter to control trajectories of emitted electrons. Fahlen et al. in the analogous art teach a control electrode (directional electrodes Fig. 2A) of Fig. 210 located near the

electron emitter (**th rmionic cathod wires ref. 209**) to control trajectories of emitted electrons (**col. 5 lines 46-51**). Additionally, Fahlen et al. teaches incorporation of such a control electrode to improve the electron distribution and electron paths by helping to shape (**col. 5 lines 46-51**).

Consequently it would have been obvious to a person having ordinary skill in the art at the time the invention was made to use a control electrode located near the electron emitter in the vacuum fluorescent display of Mera et al. in view of Tatsuda et al. since such a modification would improve the electron distribution and electron paths helping to shape as taught by Fahlen et al..


Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure Eto et al. U.S. Patent 4,041,348 disclose a Multi-Figure Fluorescent Display Tube With Electrical Lead-Ins Having Inner Spring Contact Portions. Segawa U.S. Patent 4,763,041 discloses a Dot Array Fluorescent Tube For Writing Optical Information In Optical Printer. Inoue et al. U.S. Patent 6,252,349 B1 disclose an Image Display Device Having A Cathode Board Held Between Front And Back Display Cases. Ogawa et al. U.S. Publication 2001/0008361 A1 disclose Double-Faced Vacuum Fluorescent Display Device And Method For Driving Same. Kawasaki et al. U.S. Patent 6,340,865 B2 disclose a Fluorescent Display Device And Method For Driving Same. Morimoto et al. U.S. Patent 4,472,658 disclose a Fluorescent Display Device. Morimoto et al. U.S. Patent 4,595,862 disclose a Graphic Fluorescent Display Device.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Glenn Zimmerman whose telephone number is (703) 308-8991. The examiner can normally be reached on M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nimesh Patel can be reached on (703) 305-4794. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 308-7382 for regular communications and (703) 308-7382 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is n/a.


Glenn Zimmerman
June 21, 2002


MICHAEL H. DAY
PRIMARY EXAMINER